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mathematical student for that year in University college. She was awarded the principal prize in applied mathematics and mechanics, and the Mayer de Rothschild exhibition; and Professor Clifford said, at the meeting for the distribution of prizes, that a few more students like Miss Watson would certainly raise University college to a status surpassing that of institutions twenty times as rich, and which had been two hundred years longer in existence. Praise like this from Professor Clifford would have been remarkable if it had followed years of preparation under such skilful training as English tutors know how to give. Ellen Watson had not only carried on her studies by herself, but she had been from the age of sixteen the governess, the playfellow, the nurse, of a large family of younger brothers and sisters. In order to get a little uninterrupted time for the study of quaternions and the calculus of variations, she had been obliged to form the plan of going to bed with the children, and getting up at four o'clock in the morning to begin her day's work. Such success, under such circumstances, gives reason to believe, that, if she had lived, she would have been one of the most remarkable women of her time. Her disease was consumption; and it does not appear that her death, at the age of twenty-four, was hastened by overwork. No less remarkable than her intellectual ability were the sweetness and elevation of her character. Her later correspondence shows a lofty aspiration, a passion for some high undertaking for the good of the world which her early death prevented her from entering upon. Great minds of either sex are not so common that one can feel less than profound regret that one more has been extinguished without great work accomplished.

#### NOTES AND NEWS.

THE parental relation of the large cyclonic areas of low pressure that frequently pass over our country, and which might well be called simply *cyclones*, to the tornadoes that are formed in them, has lately been discussed by W. M. Davis in the *American meteorological journal* for August; and by H. A. Hazen in the same, and in the *American journal of science* for September. The former gives a graphic illustration of about one hundred tornadoes that occurred last spring, according to Lieut. Finley's maps; the latter gives a tabular statement of a number of tornadoes of earlier years. The results agree in showing the close limitation of tornadoes to a district south-south-east of cyclone centres, as has already been pointed out in these notes; but the authors differ as to the theoretical meaning of this limitation.

— Professor Simon Newcomb, LL.D., superintendent of the U. S. nautical almanac, has been appointed professor of mathematics and astronomy in the Johns Hopkins university.

— The comet discovered by Wolf at Heidelberg, on Sept. 17, proves to belong to the interesting family of periodical comets, according to the calculations made at the Harvard college observatory by Mr. S. C. Chandler, jun., and Mr. Wendell. An attempt was made to compute an orbit from observations, Sept. 20, Oct. 1, and Oct. 11; but it was found that they could not be represented within several minutes of arc on the assumption of parabolic motion. The parabola obtained was, perihelion passage, 1884, Nov. 14, 23,309, Greenwich mean time; perihelion from node,  $170^{\circ} 40' 36''.0$ , 1884.0; node,  $197^{\circ} 16' 24''.3$ , 1884.0; inclination,  $34^{\circ} 0' 46''.8$ , 1884.0; log. perihelion distance, 0.273507; which gave the deviation of the middle place ( $C - O$ ),  $\Delta\lambda \cos\beta = +7^{\circ} 35''.8$ ,  $\Delta\beta = +4' 40''.5$ . These residuals could not be sensibly reduced by varying the ratio of the extreme curtate distances. Accordingly an orbit was computed without any assumption as to the form, with the following result: perihelion passage, 1884, Nov. 17, 71,070, Greenwich mean time; perihelion from node,  $172^{\circ} 36' 40''.5$ ; node,  $206^{\circ} 27' 36''.5$ ; inclination,  $25^{\circ} 10' 54''.3$ ; log. perihelion distance, 0.196049; mean distance, 3,536388; eccentricity, 0.555885. The corresponding period is 2,429 days, or about 6.65 years.

This comet accordingly appears to belong to the group of the Faye-Möller comet, 1857, iv., and 1874, iv., all of which have general features of resemblance. There is no evidence of any known previous appearance of this comet. If, indeed, the period above given is not considerably in error, it would be visible from the earth only at every third return to perihelion, or once in twenty years.

— Dr. Charles Rau, curator of antiquities in the U. S. national museum, Washington, D.C., is about to publish, under the auspices of the Smithsonian institution, a most valuable and interesting work entitled 'Prehistoric fishing in Europe and North America.' This work will form No. 509 of 'Smithsonian contributions to knowledge,' and consists of about 350 pages quarto. The book is illustrated with four hundred and five cuts from drawings by Mr. Trill, being either copies of already published designs, or correct representations of objects specially drawn for this work, the majority of the latter being specimens belonging to the U. S. national museum. As regards America, objects termed 'prehistoric' include such as are found in mounds and other ancient burial-places, on and below the ground, or in caves, shell-heaps, etc.; in fact, to use Dr. Rau's words, "all articles of aboriginal workmanship, that cannot with certainty be ascribed to any of the tribes which are still in existence, or have become extinct within historical times, or, to speak more distinctly, within the recollection of the white successors of the Indians."

This book is divided into two parts: part i. Europe; part ii. North America. Part i. is divided into three sections: 1<sup>o</sup>. Paleolithic age, 2<sup>o</sup>. Neolithic age, 3<sup>o</sup>. Bronze age. In part i., Europe, a short characteri-

zation of the three ages is presented, followed by a minute description of the fishing-implements peculiar to each period. Special attention is given to the fishing-articles found in the paleolithic caves of France and other countries. In the neolithic age, the artificial shell deposits of Denmark and of the other lake-dwellings of Europe are especially noticed. In the bronze age are considered the fishing-implements from the lake-settlements of Europe, and also those forms of implements not found in lake-dwellings. In part ii., North America, the subject is discussed under the following chief headings: (a) fishing-implements and utensils, (b) boats and appurtenances, (c) prehistoric structures connected with fishing, (d) representations of fishes, aquatic mammals, etc.; and (e) artificial shell-heaps. Then follow extracts from various writings of the sixteenth, seventeenth, eighteenth, and nineteenth centuries, in which reference is made to aboriginal fishing in North America; the work closing with notices of fishing-implements and fish representations discovered south of Mexico. Plate proof of this work has already been furnished to the author, and it is probable that in a few weeks this book will be within the reach of archeologists and others.

— Capt. James Mercer has been placed at the head of the department of civil and military engineering at West Point in place of Prof. Junius B. Wheeler, retired.

— The navy department has ordered Assistant Engineer Goold H. Bull, U.S.N., to Philadelphia, as professor of engineering at the University of Pennsylvania.

— The work of establishing cold-wave flag-stations is being carried on under the supervision of First Lieut. Dunwoody, acting signal-officer. He has sent out over eight thousand circulars to postmasters in the cold-wave sections, answers to which are being received daily; and there is every reason to think that within two months the flag system will be in working order. The warnings regarding cold waves will be transmitted by telegraph to the sixteen signal-corps printing-stations in the north, east, and west, whence copies of the *Farmer's bulletin* will be sent out to the different stations in the vicinity of each printing-office; and the postmaster receiving the warning will hoist his flag, thus giving notice to his neighbors of the near approach of a cold snap. These flags are not to be hauled down until twenty-four hours after the postmaster receives notice through the *Bulletin*, and then only in case he does not receive a second warning.

— Prof. J. W. Mallet of the University of Virginia has accepted the position of professor of chemistry in the Jefferson medical college, Philadelphia, which has been recently held by Prof. Robert E. Rogers.

— William C. Day, Ph.D., formerly of St. John's college, Maryland, has been appointed professor of chemistry and physics at Nashville university, Tennessee.

— The geological maps of America are excellently catalogued by J. and J. B. Marcou in their 'Mapoteca

geologica Americana,' just issued as a bulletin of the U. S. geological survey. They reach the surprising number of 924; including, however, under distinct numbers, all re-issues. The annotations are brief but valuable; and the whole is prefixed by a very interesting account of the progress of geological cartography, which is of permanent value. An excellent index completes a most serviceable publication.

— Abram S. Hall, Ph.D., a graduate of the University of Michigan, is appointed professor of chemistry and physics at St. John's college, Annapolis, Md.

— There is an error in the reports of the committees of the American association, in our last issue, which needs correcting. The statements concerning the committee on an international convention refer, not to that committee, but to the committee on the interchange of courtesies between the American and British associations for the advancement of science.

— Mr. J. Dickie of Leeds is exhibiting his recently patented invention of an aqua-aërial or wave-ship, which is supposed to be capable of making the channel passage in twenty minutes, or of running to New York and back in six days. The aqua-aërial ship presents a different section at different parts of its length; but it may be described as a broad, flat vessel with water-tight chambers all round it, and a series of three inclined planes forming the bottom. The air-ducts are of the usual shape on deck, but spread out so as to occupy one-half the breadth of the vessel at the point where they reach the bottom. They are situated just at the commencement of the inclined planes, and as two are placed side by side there are four altogether. The object of these ducts is to render each plane independent of the others; and all are supposed to assist in lifting the vessel out of the water, as it were, and to facilitate its passage over the surface. The bows curve downwards from about the deck level, and merge into the front of the first plane of the bottom; while the water-tight compartments at the sides of the vessel are formed into a sort of platform at the stern, by means of which eddy-making is to be avoided. The air-ducts have another office to perform; for, by means of self-acting valves, any tendency to roll is said to be immediately counteracted by the air-ducts on the rising side of the vessel closing automatically, thus creating a vacuum on that side, while the greater pressure exerted on the water on the other side will tend to restore it to the normal level. The inventor maintains that the power required to keep up the speed will decrease with the increase of the vessel's rate of progression, 'the only thing necessary being a high speed of engines.' Unfortunately for sea-sick people, we have as yet had no practical proof of the merits of the 'aqua-aërial vessel.'

— A cable despatch was received Oct. 15, at Harvard college observatory, from Kiel, Germany, announcing the discovery of another asteroid by Palisa. Its position was as follows: Oct. 14, 4033; right ascension,  $2^h 18^m 26.3^s$ ; declination, north  $13^\circ 47'$ ; daily motion, west  $56''$ , south  $6'$ . It is of the 13th magnitude.